

Worksheet

Quad. Poly. Ineq.

2.7

Unit 10

⑨ a) $4x^2 + 9 < 12x$
 $4x^2 - 12x + 9 < 0$
 $(2x-3)^2 < 0$
 \emptyset

b) $4x^2 + 9 \leq 12x$
 $4x^2 - 12x + 9 \leq 0$
 $(2x-3)^2 \leq 0$
 $x = \frac{3}{2}$

c) $4x^2 + 9 > 12x$
 $(2x-3)^2 > 0$
 $(-\infty, \frac{3}{2}) \cup (\frac{3}{2}, \infty)$

d) All Reals

⑩ $x^2 + 5x < 2$
 $x^2 + 5x - 2 < 0$
 $a=1 \ b=5 \ c=-2$
 $x = \frac{-5 \pm \sqrt{25-4(1)(-2)}}{2}$

$x = \frac{-5 \pm \sqrt{33}}{2}$
 $[-\frac{5+\sqrt{33}}{2}, \frac{5+\sqrt{33}}{2}]$
 $\leftarrow \text{Number line} \rightarrow$
 $\frac{-5-\sqrt{33}}{2} \quad \frac{-5+\sqrt{33}}{2}$
 Test 0
 $0^2 + 5(0) < 2$ true

⑪ $9x^3 - 12x^2 \geq x$
 $9x^3 - 12x^2 - x \geq 0$
 $x(9x^2 - 12x - 1) \geq 0$
 $a=9 \ b=-12 \ c=-1$

$x = \frac{12 \pm \sqrt{144-4(9)(-1)}}{18}$
 $x = \frac{12 \pm \sqrt{180}}{18}$
 $x = \frac{12 \pm 6\sqrt{5}}{18}$
 $x = \frac{2 \pm \sqrt{5}}{3}$

CV $0, \frac{2+\sqrt{5}}{3}, \frac{2-\sqrt{5}}{3}$

$\leftarrow \text{Number line} \rightarrow$
 $\frac{2-\sqrt{5}}{3} \quad 0 \quad \frac{2+\sqrt{5}}{3}$
 $[\frac{2-\sqrt{5}}{3}, 0] \cup [\frac{2+\sqrt{5}}{3}, \infty)$

⑫ $x^2 + 8x \leq 4$
 $x^2 + 8x - 4 \leq 0$
 $a=1 \ b=8 \ c=-4$
 $x = \frac{-8 \pm \sqrt{64-4(1)(-4)}}{2(1)}$
 $x = \frac{-8 \pm \sqrt{80}}{2}$
 $x = \frac{-8 \pm 4\sqrt{5}}{2}$

$x = -4 \pm 2\sqrt{5}$

$\leftarrow \text{Number line} \rightarrow$
 $-4-2\sqrt{5} \quad -4+2\sqrt{5}$
 Test 0 $[-4-2\sqrt{5}, -4+2\sqrt{5}]$

⑬ $-8x^2 + 4x + 1 \geq 0$
 $a=-8 \ b=4 \ c=1$
 $x = \frac{-4 \pm \sqrt{16-4(-8)(1)}}{-16}$

$x = \frac{-4 \pm \sqrt{48}}{-16}$
 $x = \frac{-4 \pm 4\sqrt{3}}{-16}$
 $x = \frac{1 \pm \sqrt{3}}{4}$

$\leftarrow \text{Number line} \rightarrow$
 $\frac{1-\sqrt{3}}{4} \quad \frac{1+\sqrt{3}}{4}$
 $[\frac{1-\sqrt{3}}{4}, \frac{1+\sqrt{3}}{4}]$

(14) a) $4x^2 + 3x + 1 \leq 0$

$a=4 \quad b=3 \quad c=1$

$$x = \frac{-3 \pm \sqrt{9 - 4(4)(1)}}{2(4)}$$

$$x = \frac{-3 \pm \sqrt{7}}{8}$$

No Solution

 \emptyset No critical value
check any pt

b) $4x^2 + 3x + 1 \geq 0$

No critical
value. Check
any pt.All Reals

(15) a) $x - 4 - 2x^2 < 0$

$-2x^2 + x - 4 < 0$

$2x^2 - x + 4 > 0$

$a=2 \quad b=-1 \quad c=4$

$$x = \frac{1 \pm \sqrt{1 - 4(2)(4)}}{4}$$

$$x = \frac{1 \pm \sqrt{-31}}{4} = \frac{1 \pm i\sqrt{31}}{4}$$

No CV

check 0

All Reals

b) $x - 4 - 2x^2 > 0$

No CV

 \emptyset

(16) a) $-7x^2 - 4 \geq 0$

$a=-7 \quad b=0 \quad c=-4$

$$x = \frac{\pm \sqrt{4(-7)(-4)}}{2(-7)}$$

$$x = \frac{\pm \sqrt{-112}}{-14}$$

No CV

 \emptyset